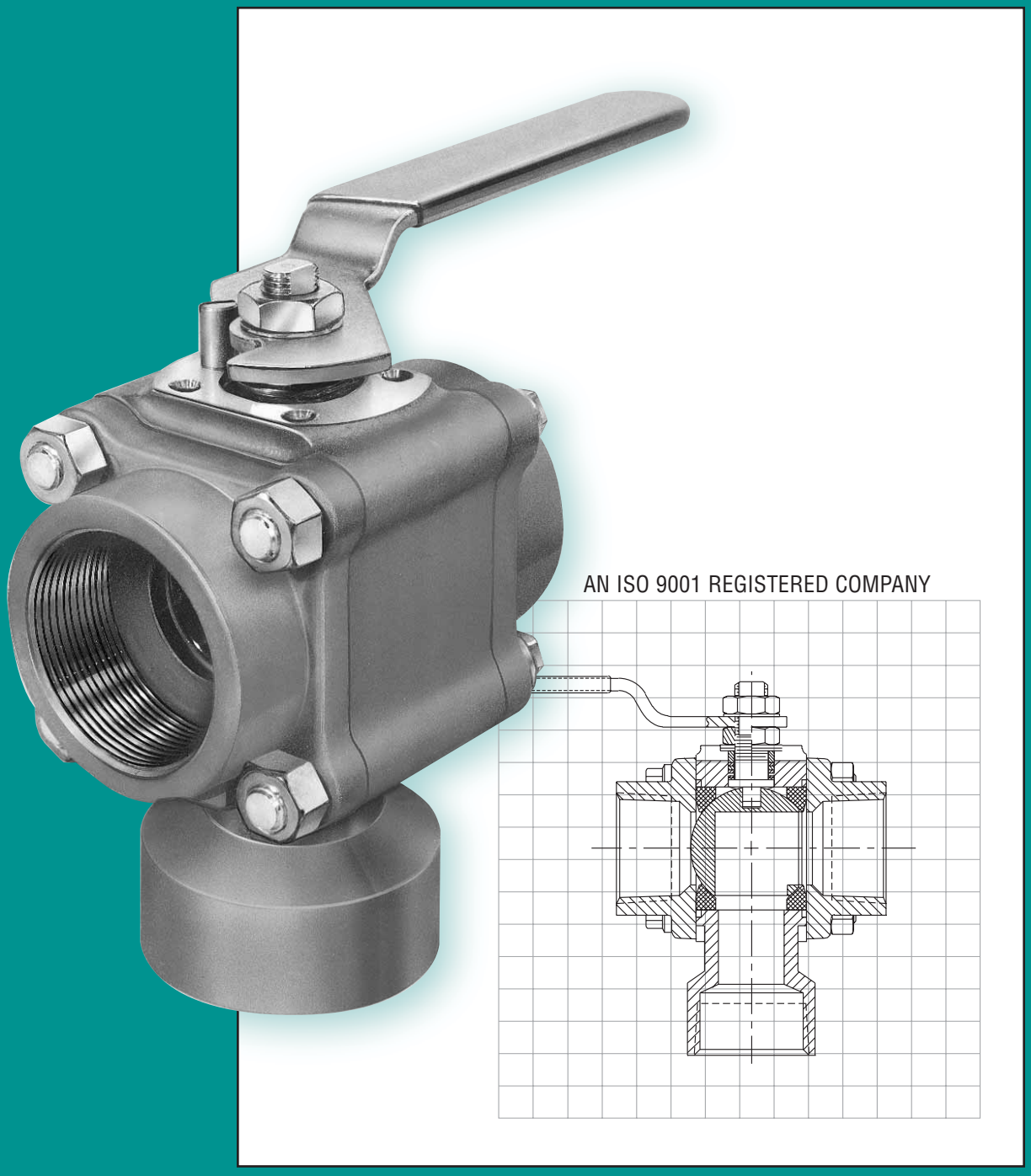
FLOWSERVE

Worcester Controls



Directional Ball Valves

Three-way or diverter style ball valves allow versatile porting for process flexibility

A rugged directional ball valve that conforms to the requirements of ANSI B16.34

DIVERTER BALL VALVE

Separate Seats and Body Seals, One Flow Direction

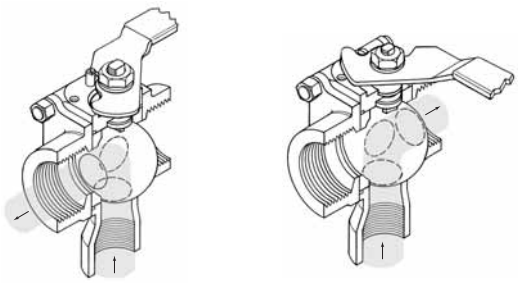
The diverter valve is designed to accept media through a bottom inlet port and direct it out either of two outlet ports. It is commonly used for alternately diverting flow from a single source to two different lines, for example dumping operations in which one outlet permits media to flow from a common source to the process while the other outlet alternately dumps or recirculates excess media.

The Diverter Ball Valve is available with two different porting configurations. V1 Porting is 90° operation for manual, pneumatic or reversing type electric actuation. The flow from the bottom inlet port cannot be shut off, only diverted to either of the two outlet ports.

V2 Porting is 180° operation for manual or 180° electric actuation. With this configuration, the flow can be shut off by simply operating the valve 90°. However, there is no mechanical stop arrangement for this position.

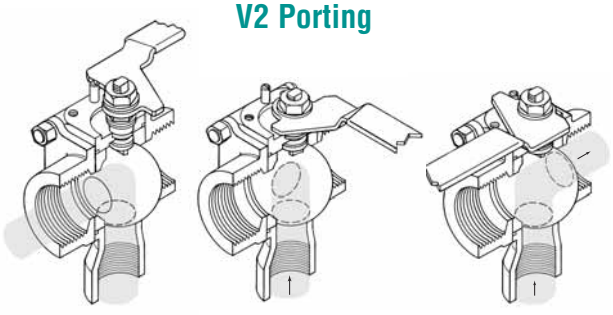
The diverter valve is constructed with separate seat and body seal.

V1 Porting



0° Porting **90° Porting**

V2 Porting



0° Porting **90° Porting** **180° Porting**

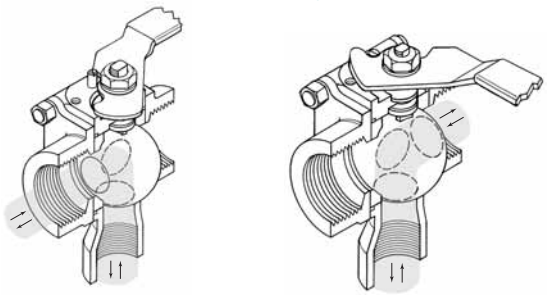
3-WAY BALL VALVE

One Piece Seat and Body Seal, Bi-Directional Flow

The 3-way ball valve provides greater flexibility in operation. Constructed with a one piece seat and body seal, the 3-way valve permits flow in both directions. It can function as a selector valve, alternately accepting media from either of two inlet sources and directing through a single outlet. Or, it may be used as a true 3-way valve, accepting media from two inlet sources for alternate discharge through either of two outlet ports. For example, in a pressurized line or system, the inlet port pressurizes or fills the system. The valve is then operated through its travel to allow the pressurized contents to be discharged through the second outlet port with the original outlet port now functioning as the inlet.

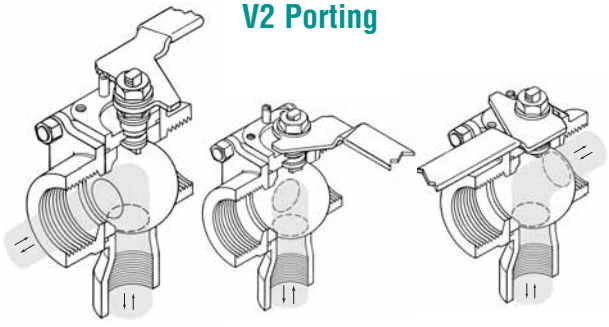
The 3-way ball valve is available with two different porting configurations. V1 Porting provides 90° operation for manual, pneumatic or reversing type electric actuation. With V1 Porting, alternate side ports are shut off at the 0° and 90° positions. V2 Porting shuts off one side at 0°, the opposite side at 180° and both sides at 90°, but there is no mechanical stop at 90°. V2 Porting permits 0° and 180° operation for manual or electric actuation only. Both positions can be shut off completely.

V1 Porting



0° Porting **90° Porting**

V2 Porting



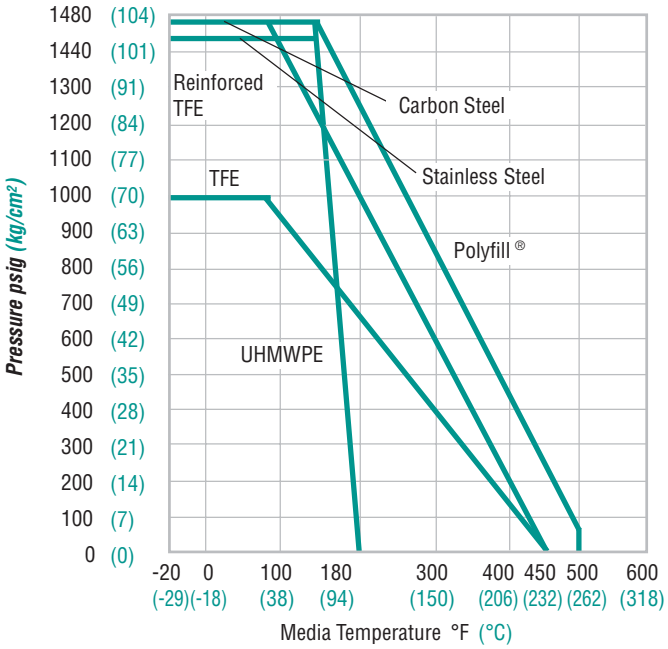
0° Porting **90° Porting** **180° Porting**

AUTOMATION

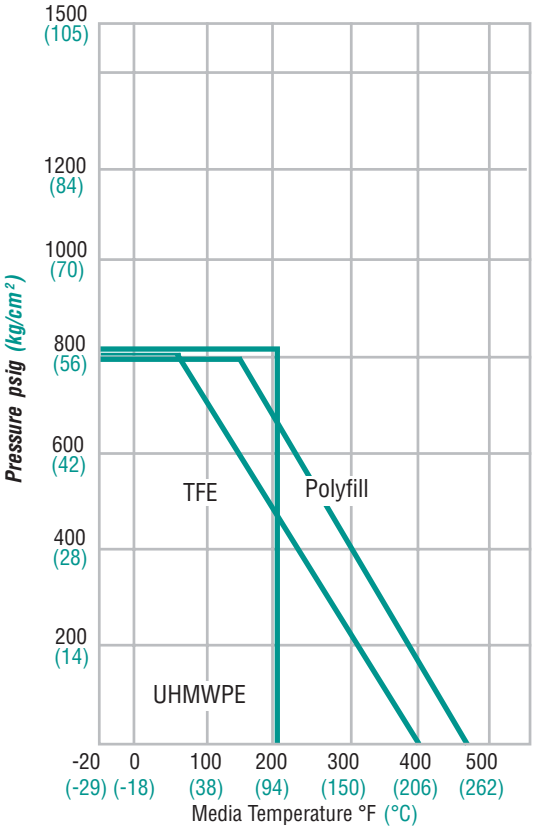
Diverter and 3-way valves with V1 Porting (90° operations) may be automated with Series 34 or 39 pneumatic actuators or Series 75 electric actuators. For V2 Porting configuration (180° operation), use the Series 75 electric actuator, also available with center-off option. Series 36 electric actuator is not suitable for use with Worcester Directional Ball Valves. 180° pneumatic actuators are available through custom products

Seat Pressure/Temperature Ratings

DIVERTER BALL VALVE



3-WAY BALL VALVE



NOTE: *In 3-way ball valves (one piece seat and body seal), 200°F maximum thermal cycle is allowed for Polyfill seats; 100°F maximum thermal cycle for TFE and UHMWPE seats.*

FLOW COEFFICIENT:

C_V values and Equivalent lengths of pipe are as follows:

Valve Size	C_V	Equiv. length of Sched. 40 pipe feet
½"	3	23.1
¾"	5	36.6
1"	10	33.4
1½"	24	55.6
2"	36	90.1

VALVE BODY PRESSURE RATINGS

Carbon Steel & S.S.:	ANSI Class 600
1/2" - 1" Brass:	1500 psi
1 1/2" - 2" Brass:	1000 psi

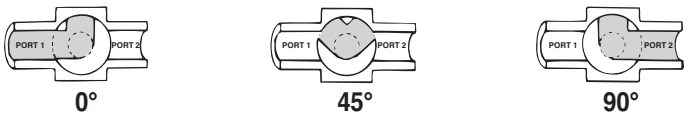
NOTE: These are body pressure ratings. Seat and seal selection will derate the valve.

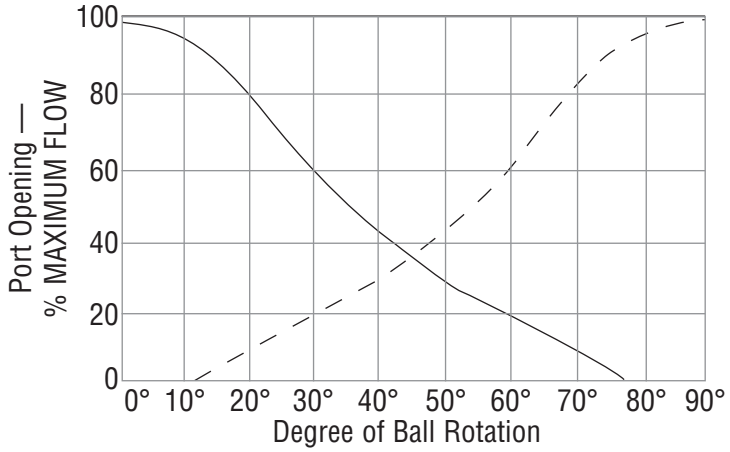
OPTIONAL HIGH PRESSURE VALVES

1/2" - 2"	Series D4 Diverter Valves with Lubetal® (Delrin®) seats are available for high pressure service.	
1/2" - 3/4"	Carbon Steel and S.S.	3000 psi
1"	Carbon Steel and S.S.	2500 psi
1 1/2" & 2"	Carbon Steel and S.S.	2000 psi

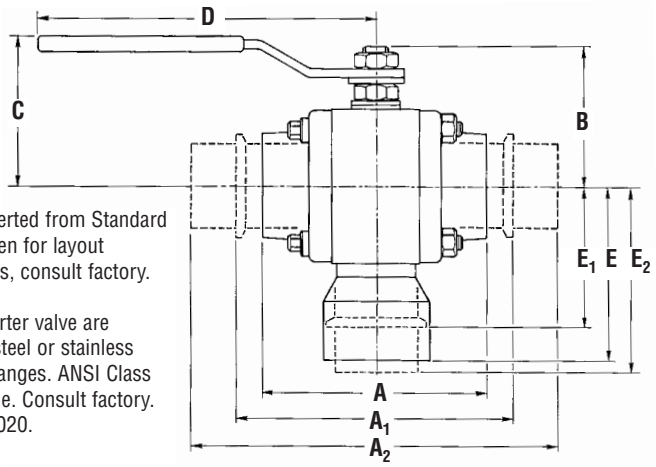
FLOW CHARACTERISTIC CURVES FOR DIVERTER VALVE

V1 Porting, 90° Operation





Dimensions - Inches (mm)



Valve	A SE, SW TE	A1 TC	A2 XBO	B	C	D
½"	2.54 (64.5)	3.50 (88.9)	5.53 (140)	1.55 (39.4)	1.76 (44.7)	5.53 (141)
¾"	2.76 (70.1)	4.00 (102)	5.77 (147)	1.64 (41.7)	1.86 (47.2)	5.53 (141)
1"	3.66 (93.0)	4.50 (114)	6.33 (161)	2.19 (55.6)	2.28 (57.9)	6.53 (166)
1½"	4.50 (114)	5.50 (140)	7.43 (189)	2.88 (73.2)	2.83 (71.9)	8.03 (204)
2"	4.94 (126)	6.25 (159)	7.60 (193)	3.06 (77.7)	3.02 (76.7)	8.03 (204)

Valve	E	E1 TC	E2 XBO	Side Port Dia.	Bottom Port Dia.	Approx. Wt. Lbs. (kg)
½"	2.25 (57.2)	1.66 (42.2)	2.94 (74.4)	.38 (9.7)	.34 (8.6)	1.5 (0.7)
¾"	2.50 (63.5)	1.76 (44.8)	3.03 (76.9)	.52 (13.2)	.50 (12.7)	2.0 (0.9)
1"	3.06 (77.7)	1.94 (49.3)	3.21 (81.5)	.75 (19.1)	.71 (18.0)	3.6 (1.6)
1½"	3.56 (90.4)	2.29 (58.2)	3.56 (90.4)	1.25 (31.8)	1.12 (28.4)	7.4 (3.4)
2"	3.94 (100)	2.44 (62.0)	3.72 (94.5)	1.50 (38.1)	1.38 (35.0)	11.1 (5.0)

Metric dimensions are converted from Standard English. Dimensions are given for layout purposes only; for tolerances, consult factory.

Flanged versions of the diverter valve are available in 2"-8" in carbon steel or stainless steel with ANSI Class 150 flanges. ANSI Class 300 flanges are also available. Consult factory. Refer to Brochure WCABR1020.

How to Order

1"	D	X	44	6	6	T	M	SW	V1
Size	Style Variation	Special Service Options	Style	Body & Pipe Ends	Ball & Stem	Seat*	Body Seal*	Body and End § Connections	Porting
½" ¾" 1" 1½" 2"	D—Diverter T—3-way	V—Vacuum Service X—Oxygen Service G—Grounded Stem E—No handle, Valve built for automation	44 4**	1—Brass (¾" - 2") 4—Carbon Steel 6—316 Stainless Steel	6—316 Stainless Steel	T—TFE P—Polyfill Y—Lubetal R—Reinforced TFE U—UHMWPE B—Buna N—Neoprene	T—TFE B—Buna E—EPR M—TFE Coated Gasket V—Viton® N—Neoprene U—UHMWPE	SE—Screw End SW†—Socket Weld TE††—Tube End TC—Quick Disconnect XBO—Extended Butt Weld NP–No Pipe Ends	V1 V2

ORDERING EXAMPLE: 1" Diverter Valve for Oxygen Service, Stainless Steel Body and Pipe Ends with Stainless Steel Ball and Stem, TFE Seats and Seals, Socket Weld Ends, and V1 Porting.

* The body seal is integral with the seat (one piece) on 3-way valves. 3-way valves are available with Fluoropolymer (T), Polyfill (P), or UHMWPE (U) seats only. When ordering 3-way valves, ignore the body seal column. Example: 1"TX4466USEV1.
** Optional high pressure valve with Lubetal seats only.
§ In some cases, other pipe end styles are available for the right and/or left ports. Consult your Worcester Controls Distributor.
† Carbon Steel or Stainless Steel only.
†† Brass only.

NOTE:
- 3-way valves cannot be used in steam service or applications with large thermal cycles.
- 3-way valves do not have a separate body seal.
- Diverter valves with metal body seals as well as filled metal seats are available. Consult Worcester Controls.
- Multiport (diverter) valves are also available. Refer to brochure WCABR1002.
- WK44 with XBO and TC end connections available as Three-Way. Refer to brochure WCABR1035.
- Lubetal Seats cannot be used for oxygen service.

CAUTION: Ball valves can retain pressurized media in the body cavity when closed. Use care when disassembling. Always open valve to relieve pressure prior to disassembly. Due to continuous development of our product line, we reserve the right to alter the information contained in this brochure as required.

Printed in USA.
FCD WCABR1017-00 (Part PB 903)